

Name: _____ Date: _____

Chemistry ~ Ms. Hart

Class: Anions or Cations



5.11 Polar and Nonpolar Compounds, Polarity

Objective: SWBAT determine whether a bond is polar, nonpolar or ionic based on the electronegativity difference of the atoms, identify a molecule as polar or nonpolar based on its bond polarity and symmetry

SPARK: what is electronegativity?

Polarity:

EN Difference	Bond Character

IONIC BONDS

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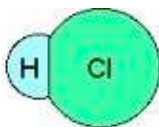
Non- Polar COVALENT BONDS

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Polar COVALENT BONDS

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Is HCl polar or non-polar?



Self-Check:

Using your reference tables, determine the difference in electronegativity and use it to predict the polarity of the covalent bonds that form between each pair of atoms (ionic, very polar covalent, moderately polar covalent, non-polar covalent):

a) H and I

c) C and H

e) Li and O

b) O and O

d) C and O

f) C and F

BOND Character:

- Ionic character

- Covalent character

Regents Question:

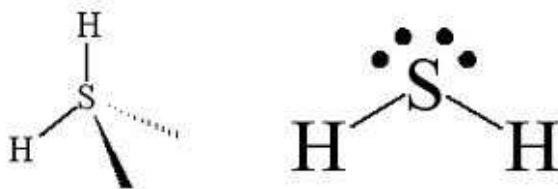
Which elements will form a bond with the most ionic character?

- a) H and F
- b) C and H
- c) C and O
- d) F and C

PRACTICE: POLAR Bonds

Directions: For the following compounds: a) Draw the Lewis dot structure, b) Label each bond as polar (P) or non-polar (NP) c) For polar covalent bonds, draw a δ^- or δ^+ on the atom for each bond. d) Label the shape that the molecule will have (use your notes from 5.10). See example below.

Example: H_2S - Since there are two atoms off the central atom and two lone pairs of electrons, the shape must be BENT!



1) HF

2) H_2O

3) CO_2

4) CHCl_3

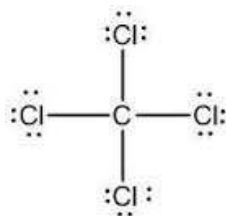
5) CH_4

6) Br_2

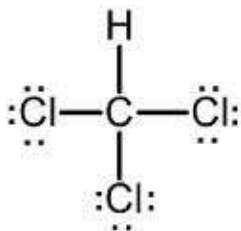
7) NH_3

Polarity of Bonds vs. Molecules

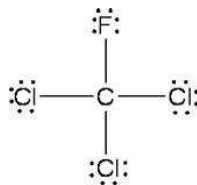
- Molecules can be _____ even if bonds are _____.
 - Molecules need to be _____ for this to occur
 - Ex. CCl_4



- Non-symmetrical compounds will be _____.
 - Ex. CHCl_3



- Dipole** -
- Ex 2. CFCl_3



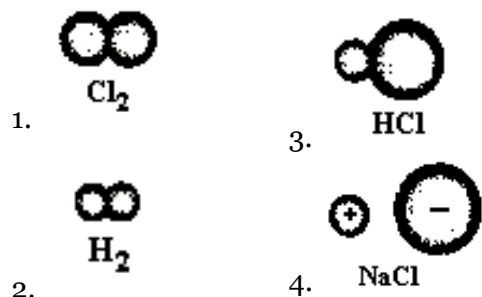
- Molecular geometry will impact symmetry and thus polarity.
 - Geometry of H_2O vs. CO_2
 - Shapes that can be symmetrical
 - Shapes that will never be symmetrical
 - Ex. NH_3

Which can be symmetrical?

- Linear = Sometimes
- Bent = Never
- Trigonal Planar = Sometimes
- Tetrahedral = Sometimes
- Trigonal Pyramidal = Never

5.11 Homework

1) Which diagram best represents a polar molecule?



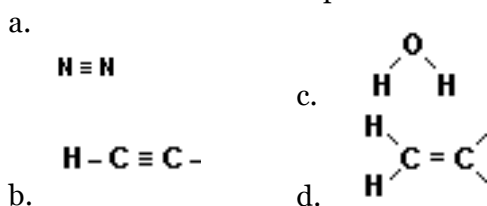
2) As a bond between a hydrogen atom and a sulfur atom is formed, electrons are

- a. shared to form an ionic bond
- b. shared to form a covalent bond
- c. transferred to form an ionic bond
- d. transferred to form a covalent bond

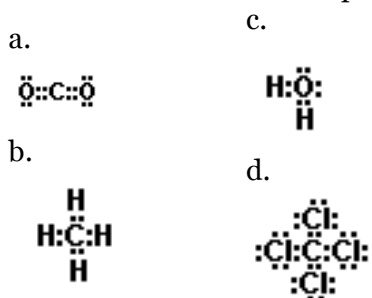
3) The chemical bond between which two atoms is most polar?

- a. C-N
- b. H-H
- c. S-Cl
- d. Si-O

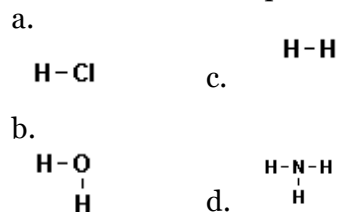
4) Which structural formula represents a linear nonpolar molecule containing two polar bonds?



3) Which electron-dot formula represents a polar molecule?



4) Which structural formula represents a nonpolar molecule?



Update glossary with the following words (use your notes and your book to help!):

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|--------------------|-------------------------------|---------------------------|
| 1. Octet rule | 8. Triple covalent bond | 14. Polar |
| 2. Ions | 9. Lewis electron-dot diagram | 15. Charge |
| 3. Bond | 10. Molecules | 16. Dipole |
| 4. Polyatomic ions | 11. Electronegativity | 17. Criss-cross rule |
| 5. Ionic bond | 12. Polarity | 18. Symmetrical molecule |
| 6. Covalent bond | 13. Non-polar | 19. Asymmetrical molecule |